

REMARKS

Claims 25-58 are pending. Claims 29-32 and 36-58 have been withdrawn from consideration by the Office as being directed to non-elected subject matter. Claims 25-28 and 33-35 have been examined.

REJECTION UNDER 35 U.S.C. § 102(b)

Claims 25, 26, 28, 33, and 34 have been rejected under 35 U.S.C. § 102(b), as allegedly being anticipated by U.S. 5,419,487 issued to Nielsen *et al.* (hereinafter “Nielsen”). Applicants respectfully disagree.

The Office Action states that “Nielsen’s invention relates to a water-borne coating composition (K1) and a compressed fluid dispersed therein (K2).” Applicants respectfully suggest the Office Action misinterprets the disclosure of Nielsen. Instead, Nielsen discloses at col. 6, ll. 26-39 compositions having reduced water content, which comprise:

- (1) forming a liquid mixture in a closed system, said liquid mixture containing a water-borne polymeric composition and compressed fluid comprising:
 - (a) a water-borne polymeric composition containing a solvent fraction having at least about 35 percent water by weight and at least one coupling agent for the compressed fluid; and
 - (b) at least one compressed fluid which is compatible with or can be made compatible with said water-borne polymeric composition and which is at least in an amount which renders said liquid mixture capable of being sprayed, wherein the compressed fluid is a gas at standard condition of 0 °C and one atmosphere pressure (STP).

Nielsen discloses a liquid mixture that must comprise a solvent fraction and a coupling agent. By contrast, Applicants’ Claim 25 recites “a first fluid (K1) forming the matrix, a second fluid (K2) forming the foam bubbles (Z1), and an amphiphilic material (K3).” Applicants disclose at page 3, 1st full paragraph “[u]nder the thermodynamic parameters of the preparation, the first fluid involved is in a liquid state of matter, preferably in a low-viscosity state. The second fluid

involved is gaseous under the thermodynamic parameters of the preparation." Applicants' composition does not comprise the "compressed fluid" disclosed by Nielsen.

Nielsen's "compressed fluid" is a supercritical fluid. Nielsen summarizes at col. 2, ll. 26-50, that supercritical fluids or subcritical compressed fluids such as carbon dioxide and ethane are not only effective as viscosity reducers, but they can produce a new "airless spray atomization mechanism." Nielsen discloses at col. 2, ll. 33-43 the process by which the atomization of his fluid occurs:

[This] new type of atomization is believed to be produced by the dissolved carbon dioxide suddenly becoming exceedingly supersaturated as the spray mixture experiences a sudden and large drop in pressure in the spray orifice. This creates a very large driving force for gasification of the carbon dioxide. The carbon dioxide gas released from solution during depressurization expands in volume and produces an expansive force that overwhelms the cohesion, surface tension, and viscosity forces that oppose atomization and normally bind the fluid flow together.

This ability to undergo a sudden and large drop in pressure is afforded by the manner in which the compositions of Nielsen are produced. This stored energy, due to super-saturation, creates a very large driving force that is responsible for the re-gasification of the formerly supercritical fluid. This large release of energy provides a mechanical force that is exceedingly large and would make it impossible to form a micro- or nano-foam.

Nielsen discloses at col. 12, line 48 to col. 13, line 11 the requirements for a decompressive spray:

[W]e have discovered that obtaining a decompressive spray is also limited by the nucleation rate at which gaseous compressed fluid is formed in the spray orifice during depressurization and not just by the magnitude of the potential expansive force available due to the compressed fluid concentration.

[W]e have discovered that sufficient compressed fluid solubility can be obtained in water-borne coating compositions that contain at least one coupling agent for the compressed fluid to give a decompressive spray...Although the water contained in the water-borne coating compositions reduces the solubility of the compressed fluid...the water can also aid nucleation of the

compressed fluid to form a gas phase during depressurization, so that the available expansive force is better utilized.

As such, Nielsen is concerned with forming a highly compressed fluid phase, because only then is it possible for the dissolved carbon dioxide (or other gas) to become exceedingly supersaturated. The depressurization of this supersaturated composition leads to compositions having a high level of potential energy.

Nielsen discloses the requirements necessary to form the high energy, expansive compositions at col. 17, line 61 to col. 18, line 9:

In order for the compressed fluid to form a liquid compressed fluid phase at temperatures and pressures at which it is a supercritical fluid, the water-borne coating composition preferably contains at least one organic solvent that is capable of being extracted from said water-borne coating composition into the compressed fluid phase. Then the compressed fluid phase comprises a liquid solution of compressed fluid and organic solvent when at pressures above the bubble point pressure for the liquid mixture. The mixture of organic solvent and compressed fluid forms a liquid phase at conditions at which the compressed fluid is a super critical fluid, because the critical temperature for the solvent/compressed fluid mixture is much higher than the critical temperature of the compressed fluid by itself whenever the compressed fluid phase contains more than a few percent organic solvent by weight. (Emphasis added.)

These conditions can be achieved because Nielsen's compositions must comprise "a solvent fraction" that can be "extracted from said water-borne coating composition into the compressed fluid phase." The compressed fluid phase then comprises a mixture of compressed gas and solvent and hence there exists a mixture having a higher critical temperature than the gas alone. This provides the explosive expansion of gas that is necessary for Nielsen to apply his coatings.

As it relates to Claims 25 and 34, the Office Action states that "[s]ince the expanded gas is enclosed and interfaced with the water-borne coating composition via the surfactant, it is inherently a foamed material." Applicants' process forms a "foamed material" not a foam *per se*. The foam that defines a foamed cushion, for example, is not the same as the foam which is

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formed when an aqueous solution of a surfactant is agitated. The artisan would clearly know the difference in the use of the term “foam” as recited in Applicants’ Claims. Moreover, the presence of a surfactant does not guarantee that the “foam” as the Office Action asserts, will necessarily be present if a surfactant is present. Nielsen teaches at col. 17, ll. 40-50:

Forming and maintaining the finely dispersed liquid compressed fluid phase in the liquid mixture may be aided by using a dispersion, emulsifying, or stabilization agent for the compressed fluid in the practice of the present invention. Such agents are generally surfactant materials, such as TERGITOLTM nonionic surfactant NP-10, that are used to produce more or less stable mixtures of immiscible liquids such as hydrocarbons in water...They promote ease of mixing by reducing interfacial tension.

As such, Nielsen does not disclose that the presence of a surfactant results in the formation of a foam, but instead acts to aid in the dispersion of the immiscible liquids. The amphiphilic material recited in Applicants’ Claims behaves in the same manner, to stabilize the micelles that result when the second fluid is dispersed within the first fluid to form pools. (*See page 3, 1st full paragraph of Applicants’ specification.*)

In summary, Nielsen discloses compositions that comprise a solvent/compressed fluid mixture that forms a super critical fluid, in that the critical temperature for the solvent/compressed fluid mixture is much higher than the critical temperature of the compressed fluid by itself. This results in an explosive release of the composition into a fine mist when the composition is depressurized. As such, not only are Nielsen’s compositions not the same as Applicants’ but Nielsen’s compositions could not be used to form the foamed materials as recited in Applicants’ claims.

REJECTION UNDER 35 U.S.C. § 103(a)

The Office Action has rejected Claim 35 under 35 U.S.C. § 103(a), as allegedly obvious over Nielsen in view of U.S. 2005/0163924 (hereinafter “Anderson”). Applicants respectfully disagree.

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The Office Action again concedes “Nielsen is silent about the composition of surfactant as octadethylene glycol monododecyl ether. However, Anderson’s invention relates to various well known functionally equivalent surfactants.” Nielsen does not disclose Applicants’ recited surfactant, therefore, the Office Action has relied upon Anderson to teach the combination of a surfactant and the composition recited in Claim 25. In asserting a case of obviousness the Office Action states:

It would have [been] an obvious substitution to one of ordinary skill in the art to use a well known alternative surfactant such as octaethylene glycol monododecyl ether, because the selection of a known equivalent material based on its suitability for its intended use supported a *prima facie* obviousness determination. See MPEP § 2144.07.

Anderson discloses “surfactant mediated metal oxide (SMM) films of the invention are generally made by coating a SMM precursor composition onto a substrate, evaporating the solvent to form a thin metal oxide-surfactant film, and removing the surfactant.” (See paragraph [0015].) Anderson cannot be used as a reference because it in no way relates to the subject matter recited in Applicants’ claims. The reasons that Anderson would select a surfactant for use in his compositions, is wholly different from the reasons that the Applicants would select a surfactant. Applicants do not remove their surfactant; however, Anderson does. As such, any teaching found in Anderson would relate to selecting a surfactant that can be removed. In addition, the compositions disclosed by Anderson are not foams, they do not comprise a supercritical fluid, and they comprise metal oxides which Applicants’ foams do not.

The Office Action has failed to establish a case of obviousness over Claim 35. Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a).

CONCLUSION

Pursuant to the above Remarks, reconsideration and allowance of the pending application is believed to be warranted. The Examiner is invited and encouraged to directly contact the undersigned if such contact may enhance the efficient prosecution of this application to issue.

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A credit card payment submitted *via* EFS Web in the amount of \$960.00 is enclosed herewith. This fee includes the \$405.00 fee under 37 C.F.R. § 1.17(e) for the Request for Continued Examination (Small Entity) and the \$555.00 fee under 37 C.F.R. § 1.17(a)(3) for the Three-Month Extension of Time (Small Entity). No further fees are believed to be due; however, the Commissioner is hereby authorized to charge any fees which may be required or credit any overpayment to Deposit Account No. 14-0629.

Respectfully submitted,

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I hereby certify that this correspondence, including any items indicated as attached or included, is being transmitted via electronic transmission via EFS-Web on the date indicated below.			
Name of Person Signing (Print/Type)	Richard S. Echler		
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